IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Ralph Bauer et al.		
Title:	SURFACE COATING SOLUTION		
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DECLARATION UNDER 37 C.F.R. §1.132

Sir, I hereby declare and state:

1. I am a joint inventor of the subject matter presently claimed in the above-identified patent application.

2. I received my undergraduate degree in Metallurgical and Materials Engineering from Middle East Technical University, Ankara, Turkey in 1997, received my M.S. degree in Ceramic Engineering from Alfred University in 1998, and received my Ph.D. in Materials Science and Engineering from Pennsylvania State University in 2001.

3. For over 8 years, I have been involved in the research and development of alumina powders. Since 2001, I have been employed by Saint-Gobain Ceramics & Plastics, Inc. (or its predecessor companies), during which time I have primarily been engaged in research and development of alumina powders.

4. I have reviewed the substance of the Office Action mailed September 17, 2008 and have reviewed Elsik et al. (US 5,550,180), Bugosh (US 2,915,475), Gernon (US 2003/0209165, hereinafter "Gernon '165"), and Gernon et al. (US 2006/0106129, hereinafter "Gernon '129").

5. Background. The claimed invention is directed to a surface coating solution including a surface coating base and boehmite particles provided in the surface coating base in an amount of 0.1 wt% to 20.0 wt%. The boehmite particles are mainly anisotropically shaped particles having an aspect ratio of at least 3:1. The surface coating solution has flow and leveling of at least 6 and a sag resistance of at least 7 mils.

The claimed sag resistance and flow and leveling properties and other claimed thixotropic properties, including set-to-touch dry time and viscosity recovery, were found to result from particular process features for forming surface coating solutions, coupled with use of anisotropic boehmite particles, particularly those boehmite particles formed through a seeded process. Such notable process features include activation of the boehmite particles prior to incorporating the boehmite particles into a grind solution.

6. Activation of Boehmite Particles.

As disclosed in the specification, anisotropic boehmite particles may be activated through treatment with an ammonium source, such as ammonium hydroxide, or through treatment with an alkali or alkali earth metal salt. Such activated boehmite particles, when incorporated in a solution, contribute to desirable thixotropic and viscous properties of the solution, notably the claimed flow and leveling characteristics and the claimed sag resistance properties. In contrast, when the anisotropic boehmite particles are not activated, the desired thixotropic and viscous properties are absent from the solution, as reported in the Declaration I provided January 25, 2008.

In addition, experiments demonstrate that while activation enhances the properties of the present anisotropic boehmite particles, activation alone does not necessarily lead to the claimed properties.

To demonstrate this point, a sample is prepared in accordance with Example 2 of the present specification, with the exception that the activated CAM-9010 boehmite is used in the amount of 7.5 lbs per 100 gallons absent the nano-clay. While the sample exhibits desirable dispersion of pigment, having a fineness of 7+ and a smooth film appearance, flow and leveling is poor, exhibiting a value of 3 at both a sample age of 24 hours and 1 week. The Leneta sag

resistance is acceptably 7 mils at a sample age of 24 hours and 11 mils at a sample age of 1 week.

Leneta sag resistance is an indicator of the efficiency of the thickener or thixotrope. High performing rheology modifiers are those that exhibit high viscosity at low shear, low viscosity at high shear, and return to their low shear viscosity rapidly. Those that fail to recover fast enough sag. After 24 hours of aging, the above CAM 9010 sample has a Leneta sag resistance value of 7 mils, which is comparable to standard coatings that employ urethane-based associative thickener. Improvements in flow and leveling often come with a sacrifice to sag resistance and vise-versa. A desirable thickener achieves a balance between the sag resistance and flow and leveling. While the above sample fails to achieve such a balance, examples provided in the present specification achieve such a balance.

In combination, the examples of the present specification, those examples discussed in the previously submitted Declaration of January 25, 2008, and the present examples, clearly demonstrate that boehmite rheology modifiers, particularly those formed through a seeded process and having anisotropic shape, influence the rheological and thixotropic properties of a latex formulation and in particular, influence properties such as flow and leveling, sag resistance, set-to-touch dry time, and shear viscosity recovery.

Accordingly, when such activated anisotropic boehmite particles are incorporated in a surface coating solution, such as a latex paint, the particles impart desirable thixotropic and viscous properties to the coating solution. In some cases, as illustrated in the examples of the present specification, such activated boehmite particles may provide the latex paint with desirable sag resistance and flow and leveling properties. For example, as disclosed in the present specification, when activated anisotropic boehmite particles are incorporated into a grind solution that is then used to form a latex coating solution, the resulting latex coating solution has desirable thixotropic and viscous properties, such as sag resistance and flow and leveling, as recited in the independent claims, as well as desirable set-to-touch dry time and shear viscosity recovery as recited in the dependent claims.

7. <u>The prior art</u>.

As demonstrated above, not all coating formulations have the claimed properties, even when activated boehmite particles are include as thickener in the formulation. As explained below, Elsik fails to disclose a latex formulation that has the claimed properties and is free of associative thickener. Bugosh fails to disclose activation of boehmite and fails to provide details regarding paint formulations. Both, Gernon '165 and Gernon '129 fail to teach or suggest use of boehmite thickeners.

Elsik is directed to latex compositions including, as a rheology modifier, a boehmite alumina. (Elsik, Abstract). In Examples 1-4, Elsik discloses use of Disperal Sol P2 in amounts of around 0.22 wt% to 0.7 wt% in an acrylic-vinyl chloride modified latex. In Example 5, Elsik provides the properties of other boehmite alumina, such as Disperal and Catapal D.

In an effort to evaluate the formulations disclosed by Elsik, several experiments were performed. The experiments utilize the identified commercially available boehmite particulate in an acrylic emulsion. While the exact ingredients of the examples of Elsik are not used due to unavailability of some of the ingredients, the experiments use similar ingredients, maintaining the approximate level of boehmite alumina identified in Example 1 of Elsik.

In the first experiment, 7.5 lbs per 100 gallons of Disperal P2 is used in an acrylic latex formulation. One sample is prepared using unactivated Disperal P2 and a second sample is prepared using Disperal P2 activated with ammonium hydroxide.

To prepare the samples, the activated or unactivated Disperal P2 is added to a grind solution including 123.2 pounds of deionized water, 1.5 pounds of Drew L-405 defoamer, 11.1 pounds of Tamol 731 pigment dispersant, 1.5 pounds of Triton CF-10 pigment wetting agent, and 195 pounds of Ti-Pure R-706 rutile titanium dioxide. The grind solution is added to a coating preparation including 523 pounds of Maincote HG-56, 4 pounds of 28% ammonium hydroxide solution, 40 pounds of benzyl alcohol, 15 pounds of dibutyl phthalate, 2.5 pounds of Foamaster 11, and 9 pounds of 15% sodium hydroxide in water. A third sample followed suggested practices for the use of Acrysol QR-708 thickener.

As illustrated in Table D1, the properties of the samples that include Disperal P2, whether activated or unactivated, fail to provide a balance between Leneta sag resistance and flow and

leveling properties. Both Disperal P2 samples have a Leneta sag resistance above 12 mils and both exhibit flow and leveling of about 0, well below 6. In addition, both Disperal P2 samples exhibit poor dispersion of pigment, having a fineness of approximately 0. In contrast, traditional thickeners, absent boehmite thickener, exhibit more balanced Leneta sag resistance and flow and leveling properties of 7 and 5, respectively. In addition, the Acrysol sample exhibits good dispersion of pigment, having a fineness of greater than 7.

TABLE D1. Disperal P2 Samples

Property	Disperal P2 (unactivated)	Disperal P2 (activated)	Acrysol RM-8W
Fineness	0	0	7+
Film Appearance	Severe Grit	Severe Grit	Smooth
Leneta Sag Resistance (24 hr) (mils)	12+	12+	7
Leneta Sag Resistance (1 week) (mils)	12+	12+	7
Flow and Leveling (24 hr)	0	0	5
Flow and Leveling (1 week)	0	0	5

In a second experiment, other boehmite agents identified by Elsik are tested. A sample is prepared using unactivated Disperal in an amount of 7.5 lbs per 100 gallons and a sample is prepared using unactivated Catapal D in an amount of 7.5 lbs per 100 gallons. The samples are prepared in accordance with the procedure described above. Table D2 illustrates the properties of the samples. While both samples exhibit flow and leveling of approximately 5, the samples

exhibit a low Leneta sag resistance of approximately 6 mils. In addition, both samples exhibit poor dispersion of pigment, having low fineness.

TABLE D2. Other Boehmite Samples

Property	Disperal (unactivated)	Catapal D (activated)
Fineness	3	1.5
Film Appearance	Slight Grit	Moderate Grit
Leneta Sag Resistance (24 hr) (mils)	6	6
Leneta Sag Resistance (1 week) (mils)	6	5
Flow and Leveling (24 hr)	5	5
Flow and Leveling (1 week)	5	6

Accordingly, samples prepared using various commercially available boehmite particulates in the amounts identified by Elsik did not produce latex paint having flow and leveling properties of at least 6 and having a Leneta sag resistance in the range of 7 mils to 12 mils. Instead, the Disperal P2 samples, even when activated, exhibit poor flow and leveling, and the Disperal and Catapal D samples exhibit poor Leneta sag resistance.

Turning to the other cited references, Bugosh is directed to fibrous aluminum monohydrate particles. Bugosh further discloses that fibrous boehmite can be used as reinforcing filler in making plastic films, coatings, paints, adhesives, or other plastic articles. The fibrous boehmite may be mixed with aqueous dispersions of polymers. (Bugosh, col. 29, ll.

1-21). Bugosh is silent regarding composition of the coatings and paints and is silent regarding characteristics of the coatings and paints, such as flow and leveling, sag resistance, and set-to-touch dry time characteristics. While, as disclosed by Bugosh, it may have been known to incorporate boehmite into coatings, paints, and adhesives, Bugosh is silent regarding activating the boehmite particulate and is silent regarding the process for forming aqueous dispersions of polymers.

Gernon '165 is directed to the use of alkylethanolamines in combination with a biocide for the anaerobic stabilization of a latex paint. In the examples, Gernon '165 discloses a flat interior paint that includes a Polyphobe 102 rheology modifier and a semigloss interior enamel that includes Cellosize ER-150000 and Acrysol SCT-275 rheology modifiers. Both paint formulations reportedly exhibit a leveling of 8. Gernon '165 does not disclose the use of a boehmite rheology modifier.

Gernon '129 is directed to latex paint formulations that contain N-n-butyl ethanolamine (BAE) as a neutralizing agent. Similar to Gernon '165, Gernon '129 discloses a flat interior paint that includes a Polyphobe 102 rheology modifier and other coatings that include RHOPLEX® or Acrysol® rheology modifiers. The flat interior paint reportedly exhibits a leveling of 8. Gernon '129 does not disclose the use of a boehmite rheology modifier.

Further, replacing an associative thickener of Gernon with an anisotropic boehmite would influence the properties of the modified Gernon paint, particularly leveling, pH, viscosity, set-to-touch dry time, and dry time. Accordingly, replacing the associative thickener of Gernon would not necessarily provide a latex paint having desirable sag resistance and flow and leveling, or even desirable pH, viscosity, set-to-touch dry time, or dry time.

In contrast to the cited references, my co-inventors and I have discovered that the present anisotropic boehmite particles advantageously produce surface coatings having desirable characteristics, such as desirable flow and leveling, sag resistance, set-to-touch dry time, and shear viscosity recovery. As explained above, not all paint formulations that include boehmite exhibit the claimed combination of properties.

8. Summary. Among the features disclosed in the present application, the above-mentioned activation of anisotropic boehmite particles contributes to a successful formation of a surface coating solution having the claimed properties. Nevertheless, as illustrated by the examples provided, not all formulations that include boehmite thickener, whether activated or not, have the claimed sag resistance and flow and leveling properties.

The foregoing innovations were created by my co-inventors and me through extensive research and development, and are at least partly the result of empirical studies on the notable engineering hurdles associated with the formation of surface coating solutions.

9. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like, so made, are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

02/02/09
Date

Doruk O. Yener, Ph.D.